

REMARKS

I. STATUS OF THE NEW CLAIMS WITH RESPECT TO EICKHOFF

Claims 1 to 12 were rejected as anticipated under 35 U.S.C. 102 (e) by U.S. Patent 7,240,675, issued to Eickhoff (called "Eickhoff" herein below).

Claims 1 to 12 have been canceled. New claims 17 to 29 have been filed.

New claims 17 to 29 include a first set of new claims for a solar collector in general and a second set of new claims for a parabolic collector. New claims 17 to 29 include the subject matter of canceled claims 1 to 12 and additional limitations to further distinguish them from the prior art, especially Eickhoff.

A. NEW CLAIMS 17 TO 22

New independent solar collector claim 17 corresponds to canceled claim 1, but includes additional distinguishing limitations to overcome the anticipation rejection. Specifically, claim 17 includes the additional limitations appearing in the last paragraph of new claim 17, which state that the mirror collar 20 has at least one reflective metal surface facing away from the cladding tube 15 that it is arranged around and said at least one reflective metal surface consists of at least one planar surface 30.

The feature that the mirror collar has a planar surface in new claim 17 was

originally present in canceled claim 9. The features that the planar surface must be reflective and metallic are based on the disclosure in applicants' specification and applicants' figs. 9 to 15.

Eickhoff does disclose a solar collector, which is a parabolic collector. The parabolic collector claimed in claim 1 of Eickhoff has cladding tubes consisting of glass tubes 15, which enclose an absorber tube comprising a plurality of individual tubes 13. The compensation pieces in claim 17 above correspond to the flexible unions 17 of Eickhoff. The conical collars of Eickhoff (claim 1) correspond to the mirror collars 20 of the applicants' claim 17.

The conical collars 20 of Eickhoff have conical mirror surfaces 21, 24. These conical mirror surfaces are curved surfaces, which are non-planar surfaces. Anticipation cannot be based on the conical collars with the conical mirror surfaces, because, in the first place, the conical mirror surfaces are **not** planar as required by the last paragraph of applicants' claim 1.

The claims of Eickhoff do not claim a solar collector or parabolic collector having mirror collars with planar reflective surfaces. The reflective surfaces of the mirror collars of the claims of Eickhoff are conical or non-planar.

Page 4 of the Office Action includes a rejection of canceled claim 9, which limits the mirror collar to including at least one planar surface. This limitation is included in new claim 17. The surface labeled 25 in fig. 3 of Eickhoff is pointed out in the Office Action as being a planar surface.

Only fig. 3 shows a part of the claimed mirror collars of Eickhoff, which has an exposed planar surface 25. In the embodiment of figs. 4 to 7, like the apparatus claimed in claim 1 of Eickhoff, the planar surfaces of both halves of the double mirror collars 20 abut against each other and are thus not exposed so that they cannot reflect solar radiation (column 4, lines 13 to 23).

The device shown in fig. 3 of Eickhoff is described in column 3, line 54, to column 4, line 2. Column 4, line 2 teaches that the material 25 shown in fig. 3 is insulation material. Fig. 3 of Eickhoff also shows that the exposed planar surface is located on insulation material 25. However insulation material in general is **not** reflective. Furthermore fig. 3 shows that the embodiment is oriented with respect to the incoming radiation so that the incoming radiation does not reach the surface of material 25.

The specification of Eickhoff simply does not teach that the insulation material is reflective or that the planar surface labeled 25 (surface of the insulation material) is reflective. Note that column 3, line 65, and following of Eickhoff states:

“In a final application of this design example the not covered bellows would be also covered by a mirror collar (21) with a conic form in the opposite direction.”

In other words, fig. 3 of Eickhoff only shows half (a part) of the mirror collar that is actually the apparatus invented and claimed by Eickhoff. The surface labeled 25 is clearly an exposed surface of the insulation. The reference does **not** teach that it is an aluminum surface of the aluminum bellows shield 22. As such Eickhoff does not teach that it is reflective, that it is a mirror surface, or that it is metallic, as claimed in applicants' new claim 17.

In addition, insulation material 25 cannot be metallic, because metallic surfaces conduct heat.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in *In re Bond*, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

Eickhoff does not anticipate applicants' new claim 17 and the dependent claims because Eickhoff does not disclose or suggest that the surface 25 is either reflective or metallic.

B. NEW CLAIMS 23 TO 29

New independent parabolic collector claim 23 also contains the limitation that the one or more reflective metal surfaces of the mirror collar that reflect the part of the solar radiation directed toward the compensation pieces 17 consist of one or more planar surfaces.

The reflective metal surfaces of the mirror collar claimed and also described by Eickhoff consist of curved surfaces, which are not planar.

The planar surface 25 shown in fig. 3 of Eickhoff is not an exposed surface of the mirror collar of Eickhoff, but only the surface of a piece of insulation that is inside the mirror collar (21, 24). The device shown in fig. 3 of Eickhoff is only a part of one embodiment of a mirror collar as described in

column 3 of Eickhoff. The surface 25 of the insulation inside the mirror collar has no need to be reflective and the disclosure of Eickhoff does not disclose that it is reflective and figure 3 does not show that the surface 25 is reflective. Also insulation cannot be metallic because metals are good conductors of heat.

For the aforesaid reasons and the new limitations in the new claims, it is respectfully submitted that new claims 17 to 29 should **not** be rejected as anticipated under 35 U.S.C. 102 (e) by U.S. Patent 7,240,675, issued to Eickhoff.

With regard to obviousness page 3, lines 23 to 26, of applicants' originally filed U.S. specification explains that the embodiments in which the one or more reflective metal surfaces of the mirror collar are one or more planar surfaces is preferable to the embodiments in which the reflective surface of the mirror collar is provided by a conical surface because radiation reflected from the conical surface will diverge but radiation reflected from the planar surfaces will be directed toward the focal line, especially in the case of a segmented parabolic mirror. As a result, the embodiments with the planar reflective surfaces will have increased efficiency and energy output.

Thus the difference between the planar reflective surfaces and the smooth conical reflective surface of the prior art provides real advantages that have practical significance.

Furthermore the Eickhoff reference teaches the opposite from the claimed

invention. Eickhoff teaches that the reflective surfaces of the mirror collars should be curved and in fact more specifically conical. Applicants' claims are now limited to mirror collars that have planar reflective surfaces, which is the opposite from curved reflective surfaces.

It is well established that a prior art reference, like Eickhoff, which teaches the opposite from a claimed invention should not be used under 35 U.S.C. 103 (a) to reject a claimed invention as obvious. See M.P.E.P. 2145. X. and also the Federal Circuit Court of Appeals has said:

“That the inventor achieved the claimed invention by doing what those skilled in the art suggested should not be done is a fact strongly probative of nonobviousness.” in **Kloster Speedsteel AB v. Crucible Inc.,** 230 U.S.P.Q. 81 (Fed. Cir. 1986), on rehearing, 231 U.S.P.Q. 160 (Fed. Cir. 1986).

In addition, the new claims cannot be rejected as obvious under 35 U.S.C. 103 (a) based on the disclosures in Eickhoff, because Eickhoff is only a reference against the claims of the present application under 35 U.S.C. 102 (e) and thus falls under the provisions of the exception according to 35 U.S.C. 103 (c).

The above-identified U.S. Patent Application is owned 100 % by Schott AG and the US 7,240,675 B2 is also assigned to Schott AG.

The above-identified U.S. Patent Application and the Eickhoff reference were, at the time the invention claimed in applicants' new claims 17 to 29 was made, owned by, or subject to an obligation of assignment to, the same person, namely Schott AG. This statement is in accordance with the provisions of M.P.E.P. 706.02 (I) (2) and according to this section of the M.P.E.P. is sufficient

to avoid an obviousness rejection of a claimed invention under 35 U.S.C. 103 (a) on the basis of disclosures in the commonly owned Eickhoff, U.S. Patent, Ser. No. 7240,675.

For the aforesaid reasons and because of the additional limitations in new claims 17 to 29, it is respectfully submitted that new claims 17 to 29 should not be rejected as obvious under 35 U.S.C. 103 (a) by U.S. Patent 7,240,675, issued to Eickhoff.

II. REJECTION UNDER 35 U.S.C. 102 (f) AND CORRECTION OF INVENTORSHIP

M. Eickhoff did not invent the invention claimed in the new amended claims 17 to 29.

M. Eickhoff only participated in the invention of the solar collector in which the mirror collars 20 have only conical reflective outer surfaces. M. Eickhoff did not participate in the later improvement in which the mirror collector is provided with a plurality of planar reflective surfaces facing away from cladding tube 15.

Accordingly in accordance with the provisions of 37 C.F.R. 1.48 (b) removal of the name of M. Eickhoff from the list of inventors in the present application is respectfully requested. M. Eickhoff is not an inventor of the subject matter claimed in new claims 17 to 29 because of the changed scope of these new claims in relation to the scope of the canceled claims 1 to 16.

For the same and aforesaid reasons new claims 17 to 29 do not claim the

same subject matter as claimed in US 7,240,675, issued to M. Eickhoff.

Accordingly withdrawal of the rejection under 35 U.S.C. 102 (f) because applicants did not invent the claimed subject matter is respectfully requested due to the removal of M. Eickhoff from the listed inventors and because of the changed subject matter in the new claims.

III. OBVIOUSNESS-TYPE DOUBLE PATENTING

Claims 1 to 7 were rejected on the grounds of nonstatutory obviousness-type double patenting as unpatentable over claims 1 to 8 of US 7,240,675 issued to M. Eickhoff.

A properly signed terminal disclaimer in compliance with 37 C.F.R. 1.321 accompanies this amendment. The terminal disclaimer disclaims that portion of the term of any U.S. Patent, that issues from the above-identified U.S. Patent Application, which exceeds the expiration date of US 7,240,675 issued to M. Eickhoff.

In view of the signed terminal disclaimer accompanying this amendment it is respectfully submitted that **none** of the new claims 17 to 29 should be rejected for obviousness-type double patenting over claims 1 to 8 of US 7,240,675 issued to M. Eickhoff.

IV. OBVIOUSNESS REJECTION

Claims 1 to 16 were rejected as obvious under 35 U.S.C. 103 (a) over U.S. Patent No. 4,202,322, issued to Delgado, et al (Delgado), in view of U.S. Patent No. 7,013,887, issued to Kuckelkorn, et al (Kuckelkorn), and in further view of U.S. Patent No. 4,296,462, issued to Bunch (Bunch).

A. LEGAL REASONS FOR UNOBVIOUSNESS

It is respectfully submitted that Kuckelkorn, et al, is not a valid prior art reference that can be combined with Delgado and Bunch to reject the claimed invention as obvious under 35 U.S.C. 103 (a) for the following reasons.

The above-identified U.S. National Stage Application is accorded the International filing date of November 4, 2004 as its U.S. filing date as explained, for example, in M.P.E.P. 1896. Thus US '887, Kuckelkorn, is not a valid prior art reference under 35 U.S.C. 102 (b), because it issued on March 21, 2006 and because the application from which it issued was published only on March 18, 2004, which is not more than one year earlier than November 4, 2004, the effective U.S. filing date of the above-identified U.S. National Stage application.

Furthermore the above-identified U.S. National Stage Application papers include a certified English translation of the DE priority document, so that applicants have already 'perfected priority' and shown that they are entitled to a date of invention for their amended claims of November 4, 2003. The aforesaid

date of the DE priority document is earlier than the publication date of the U.S. Patent Application, March 18, 2004, from which Kuckelkorn, et al, issued. Thus the Kuckelkorn patent is not a prior art reference under 35 U.S.C. 102 (a), because the U.S. Patent Application of Kuckelkorn did not become public knowledge until it was published and the publication date of that application is March 18, 2004, which is later than the applicants' DE priority date.

Thus Kuckelkorn, et al, is only a prior art reference under 35 U.S.C. 102 (e) and hence falls under the exception according to 35 U.S.C. 103 (c), like Eickhoff, because it is commonly owned by Schott AG.

The above-identified U.S. National Stage Application and the Kuckelkorn reference were, at the time the invention claimed in applicants' new claims 17 to 29 was made, owned by, or subject to an obligation of assignment to, the same person, namely Schott AG. This statement is in accordance with the provisions of M.P.E.P. 706.02 (I) (2) and according to this section of the M.P.E.P. is sufficient to avoid an obviousness rejection of a claimed invention under 35 U.S.C. 103 (a) on the basis of disclosures in the commonly owned U.S. Patent of Kuckelkorn, et al, in combination with the disclosures in any other prior art references.

B. TECHNICAL REASONS FOR UNOBVIOUSNESS

Delgado does teach a solar collector apparatus with a common absorber tube 25, parabolic reflectors 20a to 20d that concentrate solar radiation on the common absorber tube, and cladding tubes 26 enclosing the common absorber tube. Two basic embodiments are shown in figs. 1 and 10 of Delgado, in which a

plurality of individual solar collectors each comprising a parabolic reflector, the common absorber tube, and a cladding tube are connected in series. Figures 9 and 13 depict respective structures of alternative embodiments for connecting the individual solar collectors with each other.

In the case of fig. 9 the common metal absorber tube 25 passes from one individual solar collector to the other through cylindrical support tube 70, which acts to support the common absorber tube 25 (see the first paragraph in column 5 of Kuckelkorn). In the case of fig. 13 the common absorber tube 25 passes from one individual solar collector, more specifically from the glass jacket 26, 126, into a sleeve 201 (column 7, lines 26 to 46).

The parabolic mirrors in the solar collection apparatus of Delgado have end plates 35 at their opposite ends and are rotatable with respect to the common absorber tube 25 by means of the motor 30, as explained in column 3, lines 47 to 64 (see fig. 1 and fig. 8). The motor 30 is necessary so that the collector assembly can move the parabolic mirrors so that they track the sun during the day. Because of that the end plates 35 in the collector assembly of Delgado cannot be dispensed with during any proposed modification Delgado under 35 U.S.C. 103 (a). In contrast, the applicants' absorber tube is fixed by supports 14 in relation to the parabolic mirror.

Kuckelkorn, et al, discloses a metal absorber pipe or tube 3 through which a heat carrying medium can flow, a glass cladding or jacket (tube) 2 enclosing the absorber tube, a glass-metal transitional element 5 connected between the metal absorber pipe and the glass jacket and thermal expansion compensating

devices 10 between the glass-metal transitional element and the central metal pipe so that during operation in a solar collector differences in thermal expansion will not cause the development of damaging stresses to develop (see claim 1 of Kuckelkorn). The thermal expansion compensating devices 10 advantageously include bellows 11 (claim 1).

According to page 6, third full paragraph, of the Office Action:

“it would have been obvious to combine the mirror collar of Bunch to the ends [presumably of the cladding tubes 26] of Delgado”.

However there is no space to place mirror collars at the respective ends of the cladding tubes or glass jackets 26 in the assembly of Delgado, because of the presence of the end plates 35 at the ends of each parabolic mirror (fig. 8 of Delgado). The end plates 35 are necessary because the gear driven by the motor 30 is fixed to the end plates according to column 3, lines 47 to 55.

According to M.P.E.P. 2143.01 VI a proposed modification under 35 U.S.C. 103 (a) of an apparatus disclosed by a primary prior art reference is not valid if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified. In that case the teachings of the prior art references are not sufficient to render the claims *prima facie* obvious (*In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)).

In the case of the present application the proposed modification of the disclosures in Delgado would modify the principle of operation of the solar collector assembly of Delgado in a manner so that it changes the basic principle of operation of the collector. In the collector assembly of Delgado there is not

enough room at the ends of the glass jackets or cladding tubes to arrange mirror collars as suggested on page 6 of the Office Action, because of the presence of the end plates 35 and the drive motor 30 at the ends of the parabolic mirrors. The rotatability of the parabolic mirrors with respect to the absorber tube is an essential feature of the method of operation of the collector assembly of Delgado. In contrast, as noted above, applicants' absorber tube is fixed by supports 14 in relation to the parabolic mirror.

In addition, the Office Action has not provided a reason that one skilled in the art would replace the silicone rubber stoppers at the ends of the glass jackets or cladding tubes in the collector assembly of Delgado with the glass-metal transitional elements and connecting structure of Kuckelkorn. There must be a reason provided for each and every modification of the primary reference under 35 U.S.C. 103 (a) that is necessary to arrive at the claimed invention. See M.P.E.P. 2143.03.

Bunch discloses a solar collector system having a stationary reflector and a moveable receiver system with an absorber tube in which the energy is reflected from the stationary reflector to the receiver tube. The receiver tube extends lengthwise in a direction parallel to the direction from which the radiation falls on the reflector.

Bunch is cited for disclosing mirror collars 112, 116, and 90 enclosing an absorber pipe (receiver 14) in figs. 6 and 7 used in a solar collector. The mirror collars 112, 116, and 90 have curved reflective inner surfaces and are positioned

on the absorber pipe to reflect reflected radiation from the reflector 12 that would otherwise not fall on the absorber pipe or be otherwise lost back to the absorber pipe in order to increase the efficiency of the solar collector (column 7, lines 20 to 36).

However Bunch does **not** disclose or suggest mirror collars that have reflective outer surfaces, which are planar, as claimed in applicants' new claims 17 to 29 (e.g. claim 17 states that the reflective metal surface of the mirror collar faces away from the cladding tube 15 – so that it is thus an outer surface). The outer surfaces of the mirror collars of Bunch have a convex curvature as shown in figure 6 to 9 of Bunch or are otherwise unsuitable for directing radiation that reaches them directly back to the absorber pipe. However, the inner surfaces of their “mirror collars” have the right curvature to direct radiation back to the absorber pipe.

In addition, fig. 7 shows a segmented mirror collar with 8 segments, but the outer surfaces and inner surfaces of this mirror collar are not planar, but instead are curved as shown in the cross-section in fig. 9. This concentrator of Bunch is also limited to reflective inner surfaces and does not have reflective outer surfaces.

It is well established that **each and every limitation** of a claimed invention must be disclosed by or obvious from the prior art for a valid rejection under 35 U.S.C. 103 (a). See M.P.E.P. 2143.03.

Furthermore, as noted above, in regard to Eickhoff, the efficiency of the arrangement with mirror collars having flat or planar reflective surfaces is greater than with the curved surfaces.

Also the applicants' arrangement performs the additional function of protecting the thermal expansion compensating devices from concentrated solar radiation and thus avoids damage to them. This latter feature is not disclosed or suggested by the combination of Bunch, Kuckelkorn, and Eickhoff, because the mirror collars of Bunch are not arranged to protect any components of the solar collector of Bunch from incident or reflected solar radiation.

Furthermore the aspect of protecting components of the solar collector from thermal stresses using mirror collectors that is "read into" the references according to page 6 of the Office Action is **not** obvious from the combination of the aforesaid three prior art references. It is well to remember that the source of the teaching regarding the locations of the mirror collectors with respect to other components of the claimed apparatus cannot be the applicants' specification. The use of impermissible hindsight and the applicants' disclosure is not permitted under 35 U.S.C. 103.

Thus the aforesaid combination of prior art references would not establish a case of *prima facie* obviousness of the new claims 17 to 29, even if Kuckelkorn were a valid reference under 35 U.S.C. 103 (a).

For the aforesaid reasons it is respectfully submitted that new claims 17 to 29 should **not** be rejected as obvious under 35 U.S.C. 103 (a) over U.S. Patent No. 4,202,322, issued to Delgado, et al (Delgado), in view of U.S. Patent No. 7,013,887, issued to Kuckelkorn, et al (Kuckelkorn), and in further view of U.S. Patent No. 4,296,462, issued to Bunch (Bunch).

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,



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